

CLAIMS

What is claimed is:

1. A method for increasing through-put of a storage controller by dynamically adjusting host delay, the storage controller coupled to one or more host devices and to one or more disk storage units, the disk storage units collectively comprising a plurality of logical ranks, the method comprising:
 - allocating a predetermined portion of a temporary storage to each of the plurality of ranks;
 - establishing an initial destage mode whereby data is destaged from a portion of the temporary storage to the corresponding rank at a predetermined rate relative to the rate at which host write requests are processed and stored in the temporary storage;
 - destaging a data update from the temporary storage to a target rank;
 - evaluating workload conditions of the temporary memory; and
 - modifying the destage mode in response to the evaluation.
2. The method of claim 1, wherein:
 - the temporary storage comprises:
 - a cache memory; and
 - a non-volatile storage memory ("NVS"); and
 - destaging a data update comprises destaging the data update from the NVS.
3. The method of claim 2, wherein evaluating the workload conditions comprises evaluating the capacity of the NVS.
4. The method of claim 1, wherein evaluating the workload conditions comprises determining if the temporary storage is receiving host write requests faster than stored data updates are destaged.

4. The method of claim 1, wherein the initial destage mode comprises a destage to write request ratio of 3.
6. The method of claim 5, wherein the modified destage mode comprises a destage to write request ratio of less than 3.
7. The method of claim 1, wherein evaluating the workload conditions comprises evaluating long path-length processes.
8. The method of claim 1, wherein the initial destage mode is 0, whereby no correlation is present between the number of destages required before a new write request is processed.
9. The method of claim 8, wherein evaluating the workload conditions comprises evaluating whether a backlog is in danger of being created.
10. The method of claim 9, wherein modifying the destage mode comprises changing the destage mode to 1 if a backlog is in danger of being created.
11. The method of claim 8, wherein evaluating the workload conditions comprises evaluating whether a backlog is present.
12. The method of claim 11, wherein modifying the destage mode comprises changing the destage mode to 3 if a backlog is present.
13. The method of claim 12, wherein modifying the destage mode comprises changing the destage mode to 2 if the backlog is reduced.
14. A storage control unit coupled to one or more host devices and to one or more disk storage units, the disk storage units collectively comprising a plurality of logical ranks, the storage control unit comprising:

a temporary storage having predetermined portions each of which is allocated one of the plurality of ranks;

means for processing write requests received from a host device;

means for directing that data update associated with each write request be stored in one of the predetermined portions of the temporary storage; and

means for directing that each data update be destaged from the predetermined portion to the corresponding rank at a predetermined destage rate relative to the rate at which write requests are processed and stored in the temporary storage;

means for evaluating workload conditions of the temporary memory; and
modifying the destage rate in response to the evaluation.

15. The storage control unit of claim 14, the temporary storage comprising a non-volatile storage memory ("NVS").
16. The storage control unit of claim 15, wherein the means for evaluating workload conditions comprises means for evaluating the capacity of the NVS.
17. The storage control unit of claim 15, wherein the means for evaluating workload conditions comprises means for evaluating long path-length processes.
18. The storage control unit of claim 14, wherein the means for directing that each data update be destaged directs that each data update be destaged at an initial predetermined destage rate of 0 whereby no correlation is present between the number of destages required before a new write request is processed.
19. The storage control unit of claim 18, wherein the means for evaluating workload conditions comprises means for determining if a backlog is in danger of being created in the temporary storage such that the means for processing write requests is receiving write requests faster than stored data updates are destaged.

20. The storage control unit of claim 19, wherein the means for directing that each data update be destaged directs that each data update be destaged at a modified destage rate of 1 if a backlog is in danger of being created.
21. The storage control unit of claim 19, wherein the means for directing that each data update be destaged directs that each data update be destaged at a modified destage rate of 3 if a backlog is present.
22. The storage control unit of claim 21, wherein the means for directing that each data update be destaged directs that each data update be destaged at a modified destage rate of 2 if the backlog is reduced.
23. A computer program product of a computer-readable medium, usable with a programmable computer, the computer program having computer-readable code embodied therein for increasing through-put of a storage controller by dynamically adjusting host delay, the computer-readable code comprising instructions for:
- allocating a predetermined portion of a temporary storage to each of a plurality of logical ranks associated with one or more disk storage units;
 - establishing an initial destage mode whereby data is destaged from a portion of the temporary storage to the corresponding rank at a predetermined rate relative to the rate at which write requests from one or more host devices are processed and stored in the temporary storage;
 - destaging a data update from the temporary storage to a target rank;
 - evaluating workload conditions of the temporary memory; and
 - modifying the destage mode in response to the evaluation.
24. The computer program product of claim 23, wherein the instructions for evaluating workload conditions comprises instructions for evaluating the capacity of the temporary storage.

25. The computer program product of claim 23, wherein the instructions for evaluating workload conditions comprises instructions for evaluating the long path-length processes.
26. The computer program product of claim 23, wherein the instructions for destaging a data update be destaged comprise instruction for destaging the data update at an initial predetermined destage rate of 0 whereby no correlation is present between the number of destages required before a new write request is processed.
27. The computer program product of claim 26, wherein the instructions for evaluating workload conditions comprises instructions for determining if a backlog is in danger of being created in the temporary storage device such that write requests are received faster than stored data updates are destaged.
28. The computer program product of claim 27, wherein the instructions for directing that a data update be destaged comprises instructions for destaging the data update at a modified destage rate of 1 if a backlog is in danger of being created.
29. The computer program product of claim 27, wherein the instructions for destaging the data update be destaged comprise instructions for destaging the data update at a modified destage rate of 3 if a backlog is present.
30. The computer program product of claim 29, wherein the instructions for destaging the data update comprises instructions for destaging the data update at a modified destage rate of 2 if the backlog is reduced.